

Unit 13

Day 3

Composition of Functions: Domain

Composition of Piece Functions

Composition of Piece Functions

Ex1: $f(x) = \begin{cases} x-1 & x > 0 \\ 5x-7 & x \leq 0 \end{cases}$ $g(x) = \begin{cases} 2x & x > 1 \\ 3x+1 & x \leq 1 \end{cases}$

$$f \circ g = \begin{cases} (2x)-1 & x > 1 \\ 3x+1-1 & 0 < x \leq 1 \\ 5(3x+1)-7 & x \leq 0 \end{cases}$$

$$f \circ g = \begin{cases} 2x-1 & x > 1 \\ 3x & 0 < x \leq 1 \\ 15x-2 & x \leq 0 \end{cases}$$

$$f(x) = \begin{cases} x-1 & x > 1 \\ x-1 & 0 < x \leq 1 \\ 5x-7 & x \leq 0 \end{cases}$$

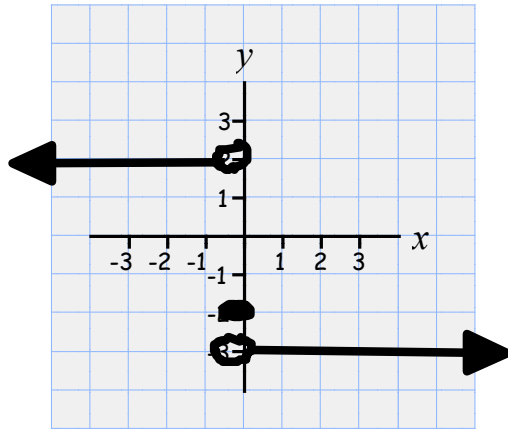
Composition of Piece Functions

Ex1: $f(x) = \begin{cases} x-1 & x > 0 \\ 5x-7 & x \leq 0 \end{cases}$ $g(x) = \begin{cases} 2x & x > 1 \\ 3x+1 & x \leq 1 \end{cases}$

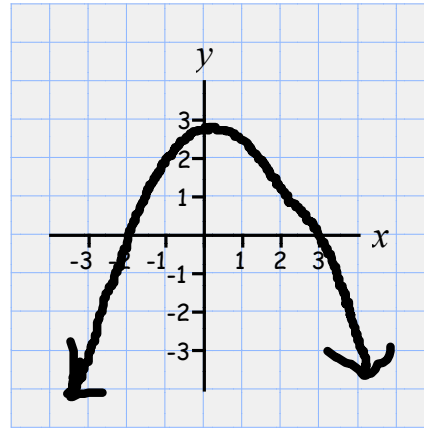
$$g \circ f = \begin{cases} 2(x-1) & x > 1 \\ 3(x-1)+1 & 0 < x \leq 1 \\ 3(5x-7)+1 & x < 0 \end{cases}$$
$$g(x) = \begin{cases} 2x & x > 1 \\ 3x+1 & 0 < x \leq 1 \\ 3x+1 & x \leq 0 \end{cases}$$

$$g \circ f = \begin{cases} 2x-2 & x > 1 \\ 3x-2 & 0 < x \leq 1 \\ 15x-20 & x < 0 \end{cases}$$

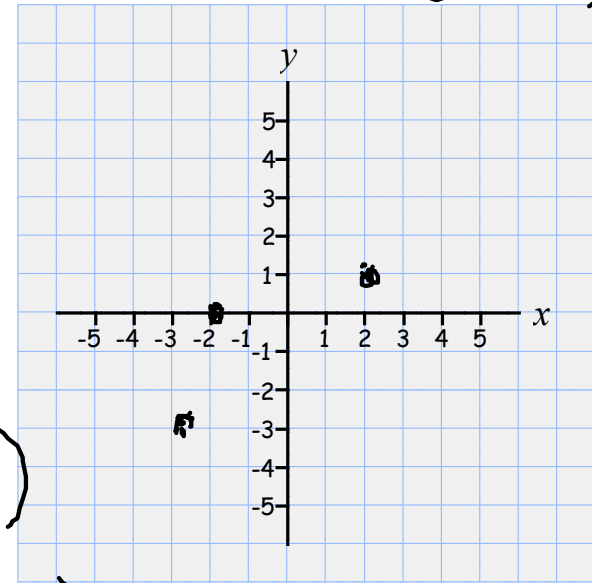
$$y=f(x)$$



$$y=g(x)$$



Draw the graph of $\cancel{f(g(x))}$
 $g(f(x))$



$$R: \{2, -2, -3\}$$

$$g(2) = 1 \quad (2, 1)$$

$$g(-2) = 0 \quad (-2, 0)$$

$$g(-3) = -3 \quad (-3, -3)$$

Finding the domain:

Ex1: $f(x) = x + 3$

$D:$

$$g(x) = \sqrt[3]{x}$$

$D:$

$$f \circ g = \sqrt[3]{x} + 3 \quad D:$$

$$g \circ f = \sqrt[3]{x + 3} \quad D:$$

Ex2: $f(x) = \frac{4}{x}$

$D:$

$$g(x) = x^2 - 4$$

$D:$

$$f \circ g = \frac{4}{x^2 - 4} \quad D:$$

$$g \circ f = \left(\frac{4}{x} \right)^2 - 4 \quad D:$$

Ex3: $f(x) = x^2 + 5$

$D:$

$$g(x) = \sqrt{2x - 3}$$

$D:$

$$f \circ g = \left(\sqrt{2x - 3} \right)^2 + 5 \quad D:$$

$$g \circ f = \sqrt{2(x^2 + 5) - 3} \quad D:$$

Ex4: $f(x) = x^2 - 1$
 $D:$

$g(x) = \sqrt{x}$
 $D:$

$$f \circ g = (\sqrt{x})^2 - 1 \quad D:$$

$$g \circ f = \sqrt{x^2 - 1} \quad D:$$

HW Wksht 1-6 all